MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

ECP2046 – COMPUTER ORGANIZATION AND ARCHITECTURE

(TE, RE)

11 MARCH 2019
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 2 pages excluding cover page with 4 questions only.

2. Attempt ALL 4 questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the answer booklet provided

QUESTION 1

a) List and describe any five key services provided by an operation system.

[10 marks]

b) Below are the five memory management techniques. Describe each technique and state their strengths and weaknesses

i) Fixed partitioning
ii) Dynamic partitioning
iii) Simple paging
iv) Simple segmentation
v) Virtual memory paging

[15 marks]

QUESTION 2

a) Convert the following numbers in decimal representation to two's complement representation with length of 8 bits

i) 7_{10}
ii) -4_{10}
iii) -128_{10}

[6 marks]

b) Calculate the following floating-point arithmetic in binary form and store in IEEE 32-bit floating-point format:

$$36.25_{10} + 0.6875_{10}$$

[5 marks]

c) Calculate $-3_{10} \times 7_{10}$ using Booth algorithm

[14 marks]

Continued ...

QUESTION 3

a) State all the types of addressing modes and draw a diagram for each to illustrate them.

[19 marks]

b) Compare *horizontal micro-instruction* and *vertical micro-instruction* in terms of microprogramming.

[6 marks]

QUESTION 4

a) By using a timing diagram, evaluate the improvement the superpipeling and superscalar machines attain compared to a pipelining machine, when executing a six four-stage instructions. Assume a degree of 2 for both the superpipeling and superscalar machines.

[11 marks]

b) List and briefly explain the five limitations to superscalar architecture.

[10 marks]

c) Refer to the instruction below:

Instruction 1 : R1 = R1 + R6;

Instruction 2 : R4 = R1 + 2;

Instruction 3 : R2 = R9 + 5;

Instruction 4 : R9 = R2 + 1;

Instruction 5 : R2 = R8 + 3;

Identify the type of dependency between the following instructions. Justify your answer.

i) Instruction 1 and 2

[2 marks]

ii) Instruction 3 and 5

[2 marks]

End of Paper